AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently amended) A computer-implemented method for expanding usable space for an application data file, comprising:

maintaining in a control file first and second control structures and first and second pointers to the first and second control structures, respectively, for the data file, wherein the first structure includes a plurality of pointers that respectively reference a plurality of bit maps that indicate available and allocated records of respective portions of usable space in the data file, and the second structure contains respective values that indicate quantities of available space in the respective portions of the data file;

limiting access to the first and second control structures to only a process that is expanding the data file while the process is expanding the data file;

allocating space for new versions of the first and second control structures in the control file;

copying contents of the first and second control structures to space for the new versions of the first and second control structures; and

updating the first and second pointers to reference the new versions of the first and second control structures.

2. (Original) The method of claim 1, further comprising:

maintaining in-memory copies of the first and second pointers while the application data file is available for access; and

updating the in-memory copies of the first and second pointers to reference the new versions of the first and second control structures.

3. (Original) The method of claim 1, wherein in a multi-host data processing arrangement for sharing the application data file, the method further comprises, after a

first host completes expanding the data file, transmitting a message from the first host to each other host, wherein the message indicates that the file has been expanded.

4. (Original) The method of claim 1, further comprising:

determining whether the first structure is large enough to accommodate expansion of the data file by a requested amount; and

performing the steps of allocating, copying, and updating only if the first structure is not large enough to accommodate expansion of the data file by the requested amount.

5. (Original) The method of claim 1, wherein a plurality of application programs share the data file and are hosted on a plurality of host data processing systems (hosts), the method further comprising conditioning expansion of a file shared by the application program on whether each host is configured to detect expansion of the data file by another host.

6. (Original) The method of claim 5, further comprising, before expanding the data file by a first host, sending to each other host a message that queries whether the other host is configured to detect expansion of the data file by another host.

7. (Previously presented) A computer-implemented method for expanding usable space for an application data file, comprising:

maintaining an in-memory copy of one or more selected control structures from a control file while the application data file is available for access, wherein the application file is logically divided into a plurality of equal-size cells, and each cell provides storage for one or more records of data;

maintaining in the control file a first structure that contains pointers to second and third structures in the control file, wherein the second structure includes a plurality of pointers that respectively reference bit maps of the cells of the application file, each bit map indicating available and allocated records in the cell, and the third structure contains respective values that indicate quantities of available space in the cells, and;

locking the first and third structures within the control file;

allocating in the control file space for a fourth structure and space for a fifth structure, wherein the space allocated for the fourth structure is greater than space occupied by the second structure, and the space allocated for the fifth structure is greater than space occupied by the third structure;

copying data from the second structure to the fourth structure and data from the third structure to the fifth structure;

updating in the first structure respective pointers to the second and third structures to reference the fourth and fifth structures, respectively; and

unlocking the first structure and the third structure after the pointers have been updated.

8. (Original) The method of claim 7, further comprising in response to a request that references an entry in the in-memory version of the third structure:

locking the third structure;

comparing a control file version of the pointer to the control file version of third structure, to an in-memory version of the pointer to the control file version of the third structure;

if the control file version and in-memory version of the pointer are not equal, then updating the in-memory versions of the pointers to the control file versions of the second and third structures, with the control file versions of the pointers to the control file versions of the second and third structures;

copying the contents of the third structure in the control file to the in-memory version of the third structure; and

unlocking the third structure.

9. (Original) The method of claim 7, wherein in a multi-host data processing arrangement for sharing the application data file, the method further comprises, after a first host completes expanding the data file, transmitting a message from the first host to each other host, wherein the message indicates that the file has been expanded.

10. (Original) The method of claim 9, wherein each host receiving a message that indicates that a file has been expanded, performs the steps comprising:

locking the in-memory version of the third structure;

updating the in-memory versions of the pointers to the control file versions of the second and third structures, with the control file versions of the pointers to the control file versions of the second and third structures;

copying the contents of the third structure in the control file to the in-memory version of the third structure; and

unlocking the third structure.

11. (Original) The method of claim 7, further comprising:

determining whether the second structure is large enough to accommodate expansion of the data file by a requested amount; and

performing the steps of allocating, copying, and updating only if the second structure is not large enough to accommodate expansion of the data file by the requested amount.

12. (Original) The method of claim 7, wherein a plurality of application programs share the data file and are hosted on a plurality of host data processing systems (hosts), the method further comprising conditioning expansion of a file shared by the application program on whether each host is configured to detect expansion of the data file by another host.

13. (Original) The method of claim 12, further comprising, before expanding the data file by a first host, sending to each other host a message that queries whether the other host is configured to detect expansion of the data file by another host.

14. (Previously presented) An apparatus for expanding usable space for an application data file, comprising:

means for maintaining an in-memory copy of one or more selected control structures from a control file while the application data file is available for access,

wherein the application file is logically divided into a plurality of equal-size cells, and each cell provides storage for one or more records of data;

means for maintaining in the control file a first structure that contains pointers to second and third structures in the control file, wherein the second structure includes a plurality of pointers that respectively reference bit maps of the cells of the application file, each bit map indicating available and allocated records in the cell, and the third structure contains respective values that indicate quantities of available space in the cells, and;

means for locking the first and third structures within the control file;

means for allocating in the control file space for a fourth structure and space for a fifth structure, wherein the space allocated for the fourth structure is greater than space occupied by the second structure, and the space allocated for the fifth structure is greater than space occupied by the third structure;

means for copying data from the second structure to the fourth structure and data from the third structure to the fifth structure;

means for updating in the first structure respective pointers to the second and third structures to reference the fourth and fifth structures, respectively; and

means for unlocking the first structure and the third structure after the pointers have been updated.

15. (Currently amended) An apparatus for expanding usable space for an application data file, comprising:

means for maintaining in a control file first and second control structures and first and second pointers to the first and second control structures, respectively, for the data file, wherein the first structure includes a plurality of pointers that respectively reference a plurality of bit maps that indicate available and allocated records of respective portions of usable space in the data file, and the second structure contains respective values that indicate quantities of available space in the respective portions of the data file;

means for limiting access to the first and second control structures to only a process that is expanding the data file while the process is expanding the data file;

means for allocating space for new versions of the first and second control structures in the control file;

means for copying contents of the first and second control structures to space for the new versions of the first and second control structures; and

means for updating the first and second pointers to reference the new versions of the first and second control structures.

16. (Currently amended) An article of manufacture for expanding usable space for an application data file, comprising:

a computer-readable medium configured with instructions that cause a processor-based system to perform the steps of,

maintaining in a control file first and second control structures and first and second pointers to the first and second control structures, respectively, for the data file, wherein the first structure includes a plurality of pointers that respectively reference a plurality of bit maps that indicate available and allocated records of respective portions of usable space in the data file, and the second structure contains respective values that indicate quantities of available space in the respective portions of the data file;

limiting access to the first and second control structures to only a process that is expanding the data file while the process is expanding the data file;

allocating space for new versions of the first and second control structures in the control file;

copying contents of the first and second control structures to space for the new versions of the first and second control structures; and

updating the first and second pointers to reference the new versions of the first and second control structures.

17. (Original) The article of manufacture of claim 16, wherein the computer-readable medium is further configured with instructions that cause a processor-based system to perform the steps of:

maintaining in-memory copies of the first and second pointers while the application data file is available for access; and

updating the in-memory copies of the first and second pointers to reference the new versions of the first and second control structures.

18. (Original) The article of manufacture of claim 16, wherein in a multi-host data processing arrangement for sharing the application data file, the computer-readable medium is further configured with instructions that cause a processor-based system to perform the step of transmitting a message from the first host to each other host after a first host completes expanding the data file, wherein the message indicates that the file has been expanded.

19. (Original) The article of manufacture of claim 16, wherein the computer-readable medium is further configured with instructions that cause a processor-based system to perform the steps of:

determining whether the first structure is large enough to accommodate expansion of the data file by a requested amount; and

performing the steps of allocating, copying, and updating only if the first structure is not large enough to accommodate expansion of the data file by the requested amount.

20. (Original) The article of manufacture of claim 16, wherein a plurality of application programs share the data file and are hosted on a plurality of host data processing systems (hosts), and the computer-readable medium is further configured with instructions that cause a processor-based system to perform the step of conditioning expansion of a file shared by the application program on whether each host is configured to detect expansion of the data file by another host.

21. (Original) The article of manufacture of claim 20, wherein the computer-readable medium is further configured with instructions that cause a processor-based system to perform the step of, before expanding the data file by a first host, sending to each other host a message that queries whether the other host is configured to detect expansion of the data file by another host.